This project is funded by the **European Union**

APPLICATION FOR PILOT PROJECTS

IN THE FRAMEWORK OF THE MED-ENEC PROJECT

- ENERGY EFFICIENCY IN THE CONSTRUCTION SECTOR IN THE MEDITERRANEAN -

Elementary School in Jerusalem

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1 SUMMARY

1.1 THE PILOT PROJECT

A new 18 classroom elementary school in South Jerusalem area, 700 m above sea level; stepped two storied terrace, South facing building (mainly classrooms). Total built area 2,251 m^2. Designed as a passive solar school, part of a program for school “green design” buildings in Israel. Will serve as a demonstration project.

1.2 THE ENERGY CONCEPT

The Energy Vision of the project emphasizes the use of maximum natural resources to create comfort conditions within the classrooms
The southern façade is used for solar air collectors to heat the classrooms.
Night air flushing is used to cool down the building structure, and maximum daylight, using “light shelves” and optimal shading.
Supplementary cooling and heating is supplied by a unitary Air Condition –HP using green refrigerant R-410.

1.3 BENEFITS OF THE PILOT PROJECT

Energy consumption per year of the pilot ptoject is	107.5 KWH/a
Energy Saving per year of pilot project is	56.0 KWH/a
Additional Investment costs in pilot project,	49,800 €
Energy cost saving in pilot project is	5,740 € per year
Cost effectiveness	8 years, +8 months

Additional benefits are:
The school as a pilot project will demonstrate the technical feasibility and profitability of energy efficiency in school design in Israel. Improvements of the school built environment. Educating the future generation.

1.4 POJECT TEAM & IMPLEMENATION PLAN

The project team:

1. architect: Ruth Lahav; R. \Lahav-Rigg LTD, Tel Aviv.
2. Research & development of energy systems: Amos Halfon, AES LTD, Haifa
3. Structural Engineer, Effi Cohen, Jerusalem
4. Project Manager: Udi Golan, NTF, Givataim.
5. Contractor: Kafrit Construction LTD, Jerusalm.
6. Documentation and publication: Raphael Yaron, IRDEW, Tel Aviv

Current Status of project: under construction, with a building permit.
Time Table: completion September 2007
Financing: Jerusalem Municipality & Israel Official Lottery.

2 THE PILOT PROJECT

2.1 THE LOCATION

The school is located on the South East side of the city, approximately 700 meters above sea level. The site for the school is a steep east-facing slope, which poses a challenge for the design of a green school. However, the stepped terrace design takes advantage of the site's extensive open views to the south and to the east. In addition to the elementary school a five classroom kinder garden is located on the site, which is bounded by roads on three sides.

The Climate:

TEMPERATURE (°C) CLIMATOLOGICAL AVERAGES

Month	XII	XI	X	IX	VIII	VII	VI	V	IV	III	II	I
Average daily maximum	13.4	18.9	25.2	27.9	28.9	28.9	27.9	25.4	20.9	16.2	13.5	11.8
Daily average	9.6	14.2	19.6	22.1	23.0	23.0	21.6	19.0	15.2	11.5	9.2	8.0
Average daily minimum	5.8	9.5	13.9	16.3	17.2	17.2	15.4	12.6	9.6	6.8	4.9	4.3
Average daily range	7.6	9.4	11.3	11.6	11.7	11.7	12.5	12.8	11.3	9.4	8.6	7.5
Average monthly max.	19.8	24.9	31.4	33.8	33.4	34.1	34.6	34.2	30.4	25.5	20.9	17.1
Absolute maximum	26.7	28.2	33.4	37.1	38.9	37.7	38.2	39.3	33.8	29.0	26.0	21.8
Average monthly min.	1.7	4.7	9.2	12.7	14.4	14.6	11.3	6.3	3.8	1.4	0.6	0.3
Absolute minimum	-1.6	1.7	6.9	10.1	13.0	13.0	9.2	4.1	1.9	-2.0	-2.9	-1.5

HEATING DEGREE-DAYS (°C DAYS)

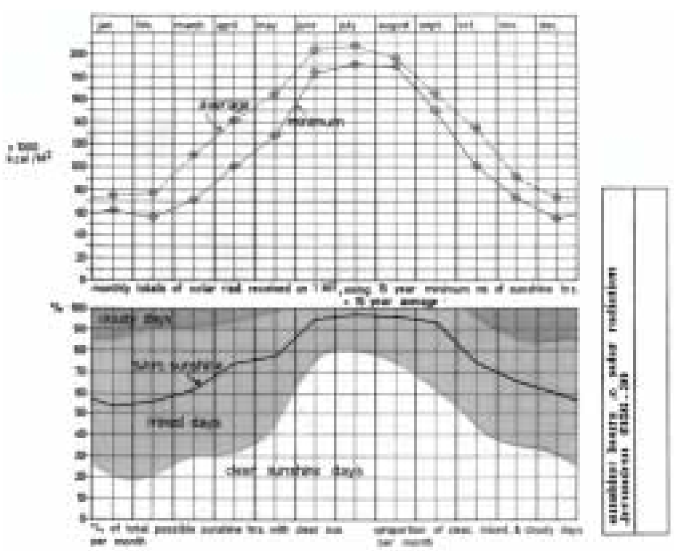
Annual \ Month	XII	XI	X	IX	VIII	VII	VI	V	IV	III	II	I
1354	268	122	19				2	32	114	215	260	322

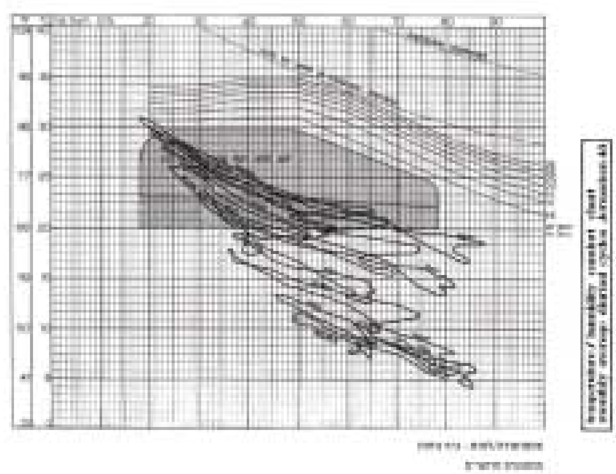
RELATIVE HUMIDITY (%)

Month	XII	XI	X	IX	VIII	VII	VI	V	IV	III	II	I
Daily average	74	62	59	66	63	59	52	51	59	70	73	76
Average at 08	79	65	58	65	62	55	45	44	57	72	78	81
Average at 14	60	46	40	42	43	42	37	36	44	55	60	63
Average at 20	79	70	70	78	77	71	64	62	68	77	78	80
Average daily maximum												
Average daily minimum												

HEAT STRESS (HOURS PER DAY)

Stress intensity \ Month	XII	XI	X	IX	VIII	VII	VI	V	IV	III	II	I
Mild				2	6	6	1					
Moderate												
Severe												
Total				2	6	6	1					





a. The climate is tempered Mediterranean
The summer is comfortable:
Average daily 23 c°
Average daily max. 29 c°
Average daily min. 17 c°
Average daily swing 12 c°
The winter is cool:
Average daily 9 c°
Average daily max. 12-13 c°
Average daily min. 4-5 c°
Annual heating degree days-degree 1354 c°

b. The cloudiness varies:
10-15% heavy clouds
60-70% mixed clouds together with 55-70% of sunshine
20-30% clear sunshine days.

c. Relative humidity (midday)
summer average: 40-45%
winter average: 60-65%

d. Heat load is mild

e. Being on the edge of the desert Jerusalem gets “Hamsin” hot (40 c°) and dry (15%), several days per annum.

f. Rainfall: 500-700 mm per annum.

g. Wind – daily mean direction: west. Mainly noon & afternoon (30-50%) night mean direction: east (15%)

h. Snow: average annual: 3-4 days, mostly during January – February, (seldom: December / March). 20cm-40cm (extreme 100cm)

2.2 THE BUILDING PROJECT

18 classroom school, with 2 special education classrooms, a library, laboratories, and technical rooms. Total area: 2,251 sq.m. The school is arranged in three groupings (wings) of classrooms. The classroom groupings express educational stages. Each wing has an access to a courtyard. Thus, each age group has its own separated courtyard. The area of each classroom is 49 sq.m. Laboratories are 60 sq.m. The entire building is accessible to people with disabilities.

Site arrangement: the school has four levels, (in three multi-level wings):

Level A at elevation	–3.60	(724.00)	310	sq.m.
Level B at elevation	0.00	(727.60)	918	sq.m.
Level C at elevation	+3.60	(731.20)	714	sq.m.
Level D at elevation	+7.20	(734.80)	309	sq.m.
Total			**2,251**	**sq.m.**

In addition to its educational value, the division to three wings enables phased construction. Estimated finishing date: September 2007.

2.3 REPRESENTATIVENESS

This project was conceived by the city of Jerusalem (the constructing governmental agency) and by IRDEW (a non-for-profit R&D organization) as a prototype for a green school. Its location, in the mountain area near the desert, yet in a prominent location in Israel, promises good results in energy conservation, and wide public attention.

Its importance is twofold:

- The success of such a project might lead the way to the design and construction of additional sustainable schools in Israel.
- Since the occupants of this building are children in an educational setting, the building itself is an excellent tool for the dissemination of ideas concerning energy conservation and green design, through tangible and accessible means, helping to create awareness to these issues at a young age.

3 ENERGY CONCEPT

3.1 BASELINE SITUATION

The main energy demands in the school build are:

Electricity for lighting, computers, office appliances, cooling, and heating

Energy Need	Peak demand Kw	Annual consumption Kwh/year	note
Light	50	40,000	
Computers	18	20,000	
Office appliances	10	14,000	
Cooling	120	50,000	Unitary DX Air Condition unit Refrigerant -R-410
Heating-Hp	120	65000	Electrical heating by HP
Elevator	30	12500	
Total	230	201,500	

- Summer Outdoor design condition - 31.5C°.
- Summers indoors design condition: - 23C° - 24.5C°
- Building condition area: - 1348 m²
- Winter Outdoor design condition: - 1.0C°.
- Summers indoors design condition: - 19C° - 21C°.
- Light level: - 600 Lux.
- Domestic hot water for 50 people 4.0 liters/day at 45C°

3.2 ENERGY CONCEPT

- The Energy Vision of the project emphasizes the use of maximum natural resources to create comfort conditions within the classrooms while reducing to minimum the heat gain during summer and the heat loss during winter by optimizing the building's orientation and the buildings envelope's thermal characteristics.
- The southern façade is used for solar air collectors to heat up the classrooms during winter, using solar passive methods.
- Because of the high daily temperature swing, night air flushing is used to cool down the building structure and enables it to absorb energy during the day without raising the classrooms air temperature above comfort level.
- The classrooms are exposed to maximum daylight without creating glare areas within the room by the use of light shelves and optimal shading features.
- Supplementary cooling and heating is supplied by a unitary Air Condition –HP using green refrigerant R-410.
- Use of PV-thermal combined water heater and electricity provider located on the roof

3.3 PLANNING APPROACH

The green energy saving school design is based on the bioclimatic ecological rationale, adopting the building to its environment, climate, and limited natural existing resources. The aim of the design is to free the user (the Jerusalem Municipality Authority) from soaring energy costs in the building, aiming at 40% savings. Climate responsive schools will create natural comfort conditions of heating, cooling and lighting, adjusted to the end users (pupils and teachers).

1. The positioning and orientation of the building was checked against the cost of site development, and was set to 16º off south towards the east. (architect's choice).
2. Direct southern exposure to all classrooms arranged around three courtyards in three terraced wings, following the sites topography, to allow winter sun penetration. (architect's choice).
3. Non-south orientation of service spaces, i.e. staircases, laboratories, corridors, storage spaces etc. (architect's choice).
4. Minimum openings to east and west. (architect's choice).
5. Use of southern elevation as air collectors to heat classrooms on two floors, integrated into curtain wall and using "shadow box" technology. (architect's choice).
6. Checking and calculating the design efficiency of the air collectors design against cost benefit with AES (Engineer Amos Halfon).
7. Designing shading devices for the southern elevation (doubling as security bars). Calculating optimal shading using "Ecotect" and "Square One" software (by Arch.. Eran Kaftan M.Arch). Using calculation feedback to improve the design of the shading devices.
8. Use of night air flushing to cool the classrooms through the corridors and northern courtyards. (architect's choice).
9. Improving the design with a differential thermostat and calculation of systems by AES (eng. Amos Halfon). Improving the design of night air flushing through the courtyards.
10. Design of "light shelves" in the classrooms to increase the level of penetration of daylight to save on artificial lighting costs.
11. Light shelves design was calculated and checked by Eran Kafttan using "Radiance" software, and adjusted where needed.
12. Improvement of the façade by insulating to save on structural costs and energy losses in winter, and energy gain in summer, making the inner wall into a "climate stabilizer". (architect's choice).
13. The wall's insulation was checked and calculated by engineer Ephraim Cohen against cost benefits, to improve structural performance.
14. Design of curved suspended ceilings next to the windows to increase depth of daylight penetration.

3.4 ENERGY MEASURES

DESCRIPTION OF LEVEL OF IMPROVEMENT FOR THE PILOT PROJECT.

insulation

Building component	Area [m²]	u-value pilot project [W/m²K]
Façade	2996	0.55
Windows (incl. frames)	269	3.57
Glazing	242	3.57
Roof Aluminium cladding	380	0.4
Roof Concrete	960	0.36
Ceiling	911	1.66

Air conditioning systems:
The Air condition system is based on split units – Heat pump. Each classroom is handled by a split unit for heating or cooling.
Technical performances of the unit:

- Cooling capacity: 24,250 btu/hr
- Heating Capacity: 26,600 btu/hr
- Efficiency cooling Factor (C.O.P) = 3.00
- Efficiency cooling Factor (C.O.P) = 3.50

The Heating system is based also on solar thermal collectors which are installed on the south façade of the classrooms. Automatic damper system & grilles supply hot air to the room during the winter season days.

MEASURES FOR ENERGY CONSERVATION

- Insulation, to prevent heat loss: The external Envelope of the building is thermally isolated (double skin stone faced concrete with 50mm insulation) in order to minimize the heat loss from the building year around.
- Optimal shading, to prevent heat gain.
- “Light shelves”, to improve daylight penetration and reduce the use of artificial lighting
- curved suspended ceilings next to the windows to increase depth of daylight penetration and reduce the use of artificial lighting

RATIONAL USE OF ENERGY

Using high efficiency air conditioning unit with reverse cycle heat pump with green refrigerant R-410 for heating, using the outdoor air as a heat source for the unit.

USE OF RENEWABLE ENERGIES

1. Solar radiation for space heating using passive solar air collector system.

- The Heating system is based also on solar thermal collectors which are installed on the south façade of the building.
- The total solar collector will be about: 100m2 (black shadow box, single clear 4mm glazing)

- Automatics dampers system & grilles are installed in the class and supply hot air to the room during the winter season days.
- The effectiveness of the solar air collectors in saving on heating costs in the winter was calculated according the Net heat gain available to the class space through the solar collector and the reduction the envelope heat losses. It was found that per classroom (floor area 49 m2) with an 11.5 m2 solar air collector, and 12.5 m2 glazed window, a saving of 155 Kwh/year is achieved in heating energy.

2. The daily temperature swing (12 c^o) is taken advantages of for space cooling utilizing a night air flushing system.

- Night air flushing is implemented through ventilation fans and automatically controlled windows that are operated during the night. Utilizing the outdoor lower air temperature compared to the face structure temperature (about Delta T 5-80C). This Method saves about 25% of energy consumption for cooling.

3. Use of PV-thermal combined water heater and electricity provider located on the roof

3.5 LEVEL OF THE IMPROVEMENT

Standard Building Solution:

Building component	Area [m²]	u-value conventional project [W/m²K]
Façade	2996	1.25
Windows (incl. frames)	269	5.28
Glazing	242	5.28
Roof	1340	1.00
Ceiling	911	1.66

Description of level of improvement for the pilot project:

Building component	Area [m²]	u-value pilot project [W/m²K]
Façade	2996	0.55
Windows (incl. frames)	269	3.57
Glazing	242	3.57
Roof Alumni cladding	380	0.4
Roof Concrete	960	0.36
Ceiling	911	1.66

Percentage of improvement:

Building component	Area [m²]	Improvement of U-value pilot project - %
Façade	2996	56%
Windows (incl. frames)	269	32%
Glazing	242	32%
Roof Alumni cladding	380	-
Roof Concrete	960	-
Ceiling	911	-

4 COSTS AND BENEFITS

4.1 ENERGY SAVINGS

ENERGY CONSUMPTION OF THE STANDARD SOLUTION

Energy consumption	Energy source	Energy consumption [KWh/a]	Energy consumption [kWh/m²/a]
End energy use for heating	Electricity	65,000	29
End energy for cooling	Electricity	50,000	22
End energy for light	Electricity	20,000	9
Electricity use for household appliances	Electricity	26,500	12
Domestic hot water	80% solar	1400	0.62
Domestic hot water	Electricity	600	0.27
Etc.		163.5	

Method of calculation:
Cooling energy consumption is calculated based on actual operation hours (524 hours) and the full load hours concept .
Heating energy consumption base on degree-hour mathod in Jerusalem using COP=2.5 for heat pump. Total operation hours 676 (for the school).

ENERGY CONSUMPTION OF THE PILOT PROJECT

Estimates of the energy consumption including subdivision for energy consumption and energy source:

Energy consumption	Energy source	Energy consumption [KWh/a]	Energy consumption [kWh/m²/a]
End energy use for heating	Electricity	39,000	17.3
End energy for cooling	Electricity	30,000	13.3
End energy for light	Electricity	10,000	4.5
Electricity use for household appliances	Electricity	26,500	12
Domestic hot water	80% solar	1400	0.62
Domestic hot water	Electricity	600	0.27
Etc.		107.5	

4.2 ECONOMIC ANALYSIS

INVESTMENT COSTS

Building component	Area [m²]	Investment costs pilot project [Euro]	Investment costs standard solution [Euro]	Additional investment costs [Euro]
Façade	2296	364,500	370,000	-5,500
Windows inc. glazing	269	99,150	90,450	+8,700
Roof	1340	161,700	161,700	-
Ceiling (inc. acoustical panels)	911	102,800	99,180	3,620
Air collectors	100	34,880	-	34,880
Night ventilation		8,100		8,100
Total additional investment costs		771,130	721,330	49,800

ENERGY COSTS

Energy costs standard solution:

Energy consumption pilot project	Energy source	Unit price (Euro) /[kWh]	Energy costs [Euro/a]
Costs for heating	Electricity	0.10	6500
End energy for cooling	Electricity	0.10	5000
Domestic hot water	Electricity	0.10	200
Light	Electricity	0.10	2000
TOTAL			**13,700**

Energy costs pilot project

Energy consumption pilot project	Energy source	Unit price (Euro) /[kWh]	Energy costs [Euro/a]
Costs for heating	Electricity	0.10	3900
End energy for cooling	Electricity	0.10	3000
Domestic hot water	Electricity	0.10	60
Light	Electricity	0.10	1000
TOTAL			**7690**

Energy cost savings **5740 Euro/annual**

Notes on additional investments costs:

1. Façade: Jerusalem standard façade is a double skin concrete stone faced wall with 30mm polystyre insulation. Implementation of better insulation to the walls, 50mm polystyre, to prevent heat loss.
2. Air collectors façade: replacing part of the concrete faced wall ($100m^2$) with air-collectors, including automatic dampers and grilles.
3. The standard school windows in Jerusalem are aluminium sliding/pivot/fixed panel double glazing windows. “Light Shelves” were implemented to increase penetration of daylight.
4. Ceiling in schools include acoustical panels in passages and parts of the classrooms. Additional cost was added to curved suspended structure to help better penetration of daylight.
5. Night ventilation, using the temperature swing of 12 cº (average in summer) to cool the insulated concrete structure, using differential-thermostat to electrically operate windows and vents.

4.3 ADDITIONAL BENEFITS

1. The school as a pilot project will demonstrate the technical feasibility and profitability of energy efficiency in school design in Israel.
2. The schools’ built area in Israel:
   a. all over: 600 classes = 75,000 m^2 per year
   b. similar climate conditions :
      (Galil mountains, Jerusalem area, Negev Mountains)
      240 classes = 30,000 m^2 per yaer.
   c. Using the pilot project methods in other similar areas will save energy costs of 76,500 €/A
3. Improvements of the school built environment:
   a. natural even daylighting in classes for better concentration of pupils.
   b. natural cooling for 4-5 hours for better comfort in classes
   c. providing better quality of space heating
   d. saving up to 25% of energy cost to school administration budget for better education.
4. Educating the future generation:
   a. adopting sustainable design as a method for living
   b. saving on limited resources of fossil energy
   c. demonstrating solution for saving on green house gas emission (CO_2)

5 IMPLEMENTATION PLAN

5.1 CURRENT STATUS OF THE PROJECT

The school is Currently under construction. Building Permit was obtained during 2005 and construction of five kindergarten classes on the site started at the end of 2005. Whilst the school construction has begun during 2006. The estimated completion date is September 2007, at the beginning of school's year. The Jerusalem Municipality Public Building Construction Department is responsible for the construction contract, which was signed during 2005 with "Kafrit" LTD, a well known construction company based in Jerusalem (Beit Zafafa). A project manager N.T.F Mr. Udi Golan, was nominated by the municipality to supervise the construction.

5.2 PLANNED IMPLEMENTATION PROCESS

During the construction period all energy measuring devices will be installed according to the original plans, and detail drawings. The Jerusalem Municipality Public Building Construction Department will supervise the process carried out according to contract by "Kafrit Constructions” LTD.
At the end of the construction, (estimated date: September 2007), all the typical classroom spaces will measured for energy consumption and compared on an annual basis to the planned system's simulation, as well as to a standard primary school in Jerusalem.
In order to be able to measure such a project, temperature sensors, energy meters, climate assessors, solar radiation motors, light meters, human comport questioners, etc, will be installed and used. The comfort conditions and the energy consumption will be compared to a standard building in order to prove the design of energy conscious school buildings in Jerusalem and similar climate zone are in Israel, (~ 30% of the country’s area).

5.3 TIMETABLE

- Date of construction completion – (estimated) September 2007
- Set up of monitoring procedure – July 2007- Aug 2007
- Monitoring period of implementation and developing dissemination strategy – September 2007 – September 2008 (during the period July-August monitoring without pupils).
- Documentation and publication of achieved results – October - December 2008.

5.4 RISK ASSESSMENT

not applicable at present construction operation.

5.5 INVESTMENT PLAN

The following are estimated investment plan cost:

1.	Construction cost: funded by the Jerusalem Municipality and the Israel Official Lottery	
2.	Implementation of pilot project passive energy design– administration, design, calculation methods etc.	25,000€
3.	Setting up monitoring procedure Devices, computers, data logs, questionnaires	10,000€
4.	Establishment of monitoring schemes, and execution	40,000€
5.	Development and implementation of dissemination strategy	10,000€
6.	Documentation and publication of achieved results	15,000€
Total cost of plan:		**100,000€**

6 CONSORTIUM

Consortium Leader:
Public Building Construction Department, City Engineer, City of Jerusalem.

Head of Department: Aharon Ben-Noun

The Department of Public Building Construction is responsible for the master-planning, initiation, design, and construction of all public buildings in Jerusalem. The department has 25 employees, architects, engineers, and project managers.
Together with IRDEW, the department initiated and carried through this school project, as a prototype for sustainable design of educational institutions nation wide. The department is continually committed to the advocating of energy conservation through the implementation of sustainable design in public construction in Jerusalem.
The Department's Annual budget is: 43,000,000 €
Total ongoing projects per annum: 20 projects
Total construction per annum: 70,000 sq.m.

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IRDEW (R&D)
Institute for Research and Development of Educational and Welfare Institutions

Director: Raphael Yaron

A non-for-profit organization, founded by the Ministry of Education in 1971. The organization is funded by local authorities and various governmental agencies. IRDEW has 3 permanent staff members, and 20 freelance consultants – architects, planners, geographers, etc.
Among its many goals are:
R&D of the physical aspects of welfare and educational institutions, developing construction standards, physical programs, re-adaptation of existing structures, and educational master planning.
The institute is the leading organization in Israel that advocates sustainable design in school construction. The Institute has numerous publications on school construction including guidelines for the design of green schools.
annual budget: 260,000 €.

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Consortium Contact Person, Architect:
R. Lahav-Rigg Architects and Town Planners.

Principles: Ruth Lahav

R. Lahav-Rigg Architects was established in Tel Aviv in 2002, continuing Lahav Rigg Architect that was established in 1980 in Jerusalem. The office has 5 employees. It specializes in sustainable design, town planning, public buildings, commercial buildings, and housing.
Selected passive solar and "green" projects:
Luz Industries Israel Headquarters, Jerusalem, (1985), 10,000 sq.m.
Nofim Senior Residence, Jerusalem, (1986), 15,000 sq.m.
Government Administration Center, Beer Sheva (2000), 72,000 sq.m.
Sewing factory, Ramla (1985) 1000 sq.m.
Private solar houses (1980-1990)
Ruth Lahav has been the secretary to the Architecture and Energy Workgroup of the UIA for many years.
Turnover: 206,000€ per annum.

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Energy Consultant:
A.E.S - ADVANCE ENERGY SYSTEM LTD

Principles: Amos Halfon

Advance Energy Systems Ltd. (AES) was established in Israel in September 1980 by Mr. Amos Halfon, B.Sc.M.E for design, research and development of energy and HVAC systems for commercial and industrial buildings.
Location of the Home office: Business center-Tirat Carmel Haetgar 2 street .
The staff of the AES Company includes 10 employees.
Field of Experience:
Design of heating, ventilation and air-conditioning systems for commercial, residential and industrial facilities. Architecture of and system engineering for energy-efficient buildings. Research, development and engineering of solar and renewable-energy systems. Design and development of energy management and control systems. Design of passive solar buildings. Design of active solar heating and cooling systems and domestic hot water systems. Energy-conservation audits for existing buildings. Project management for electro-mechanical installations. Tunneling ventilation and smoke removable systems design.
Turnover: 400,000€ per annum.

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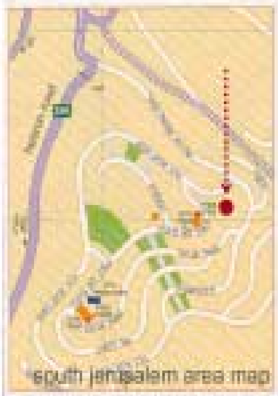
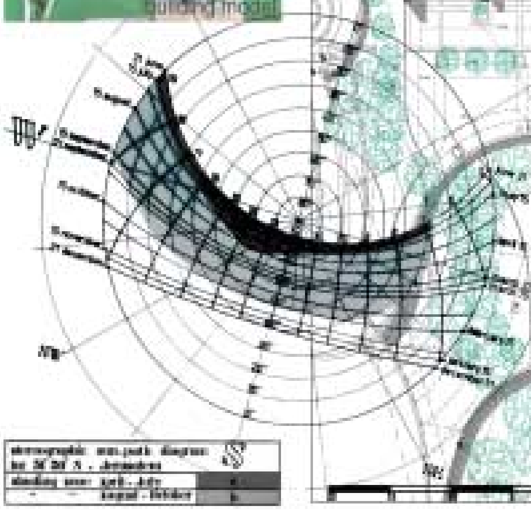
ANNEX I -1

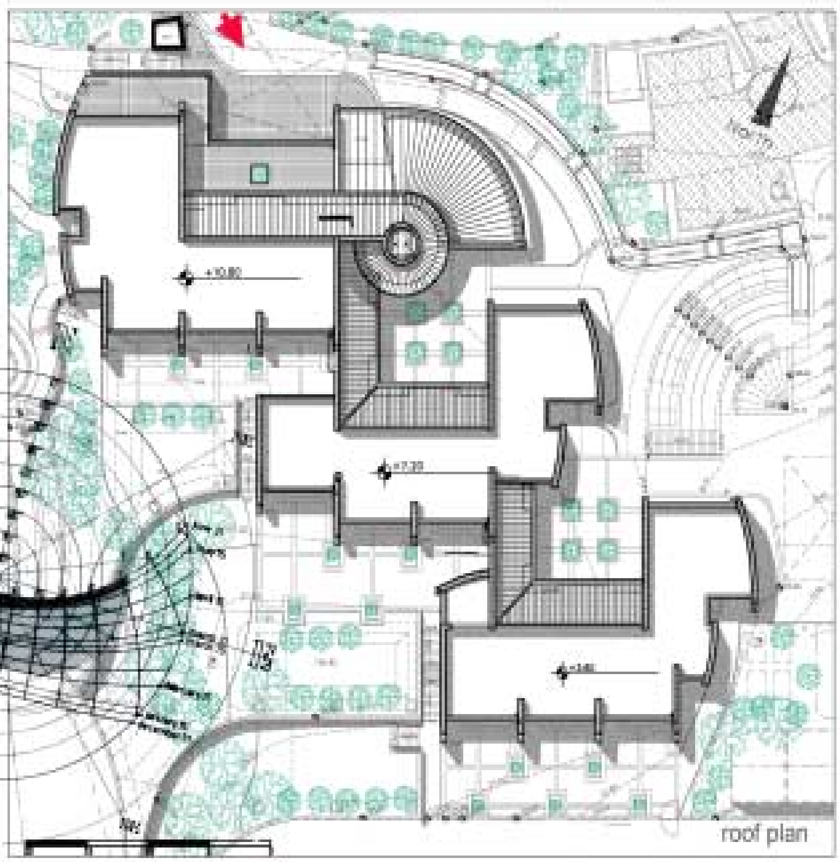

south jerusalem area map


North
neighborhood general site map

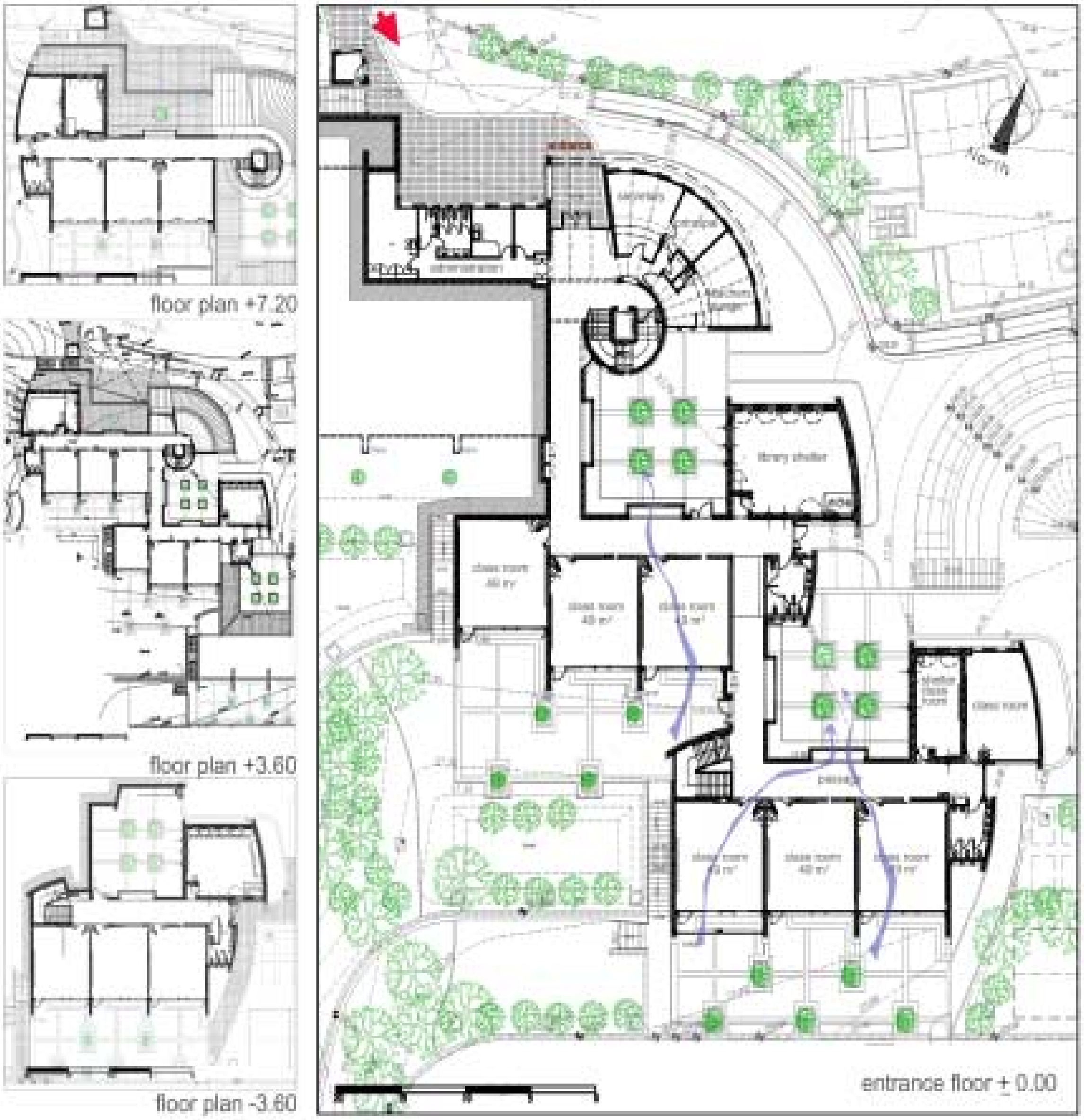

building under construction
-lower wing-

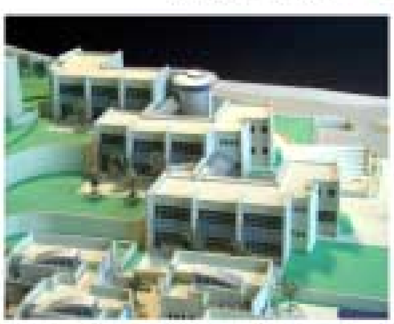

building model



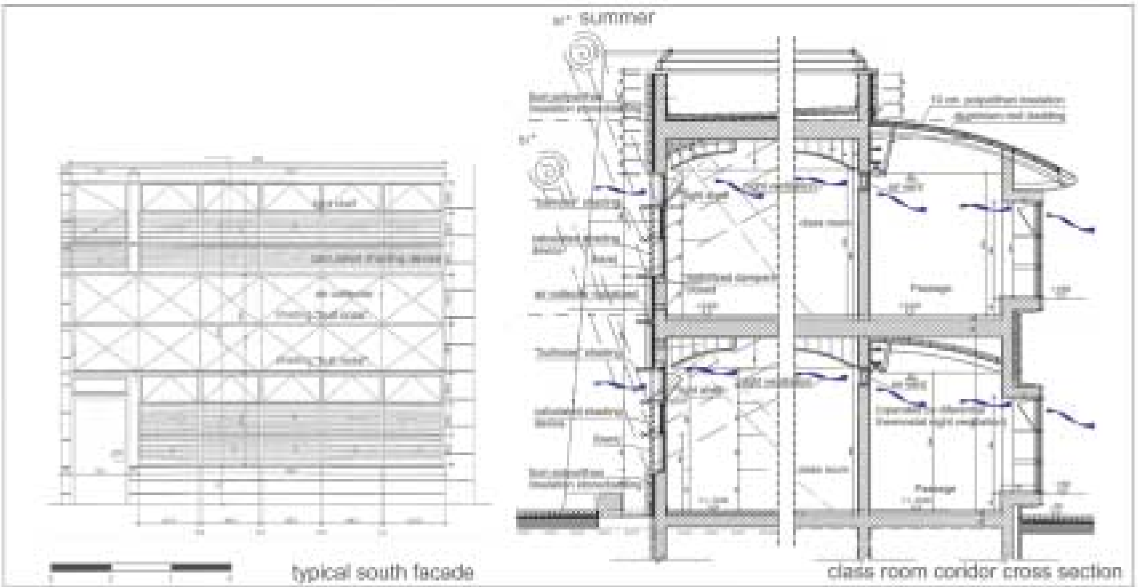

North
roof plan

ANNEX I-2


floor plan +7.20
floor plan +3.60
floor plan -3.60
North
entrance floor ± 0.00



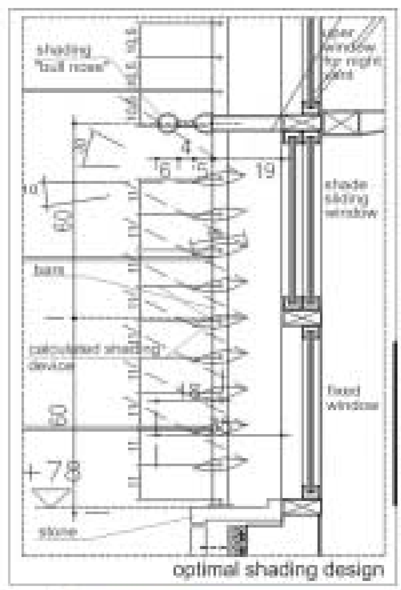
ANNEX I-3



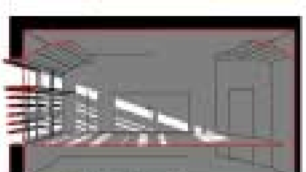
typical south facade

class room coridor cross section

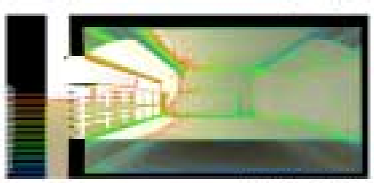
south elevation: air collectors + shade windows + light shelf



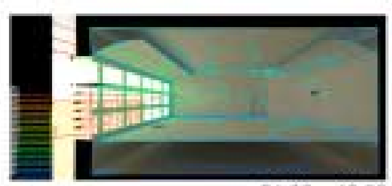
optimal shading design



optimal shading calc. "ecoteck "prog.



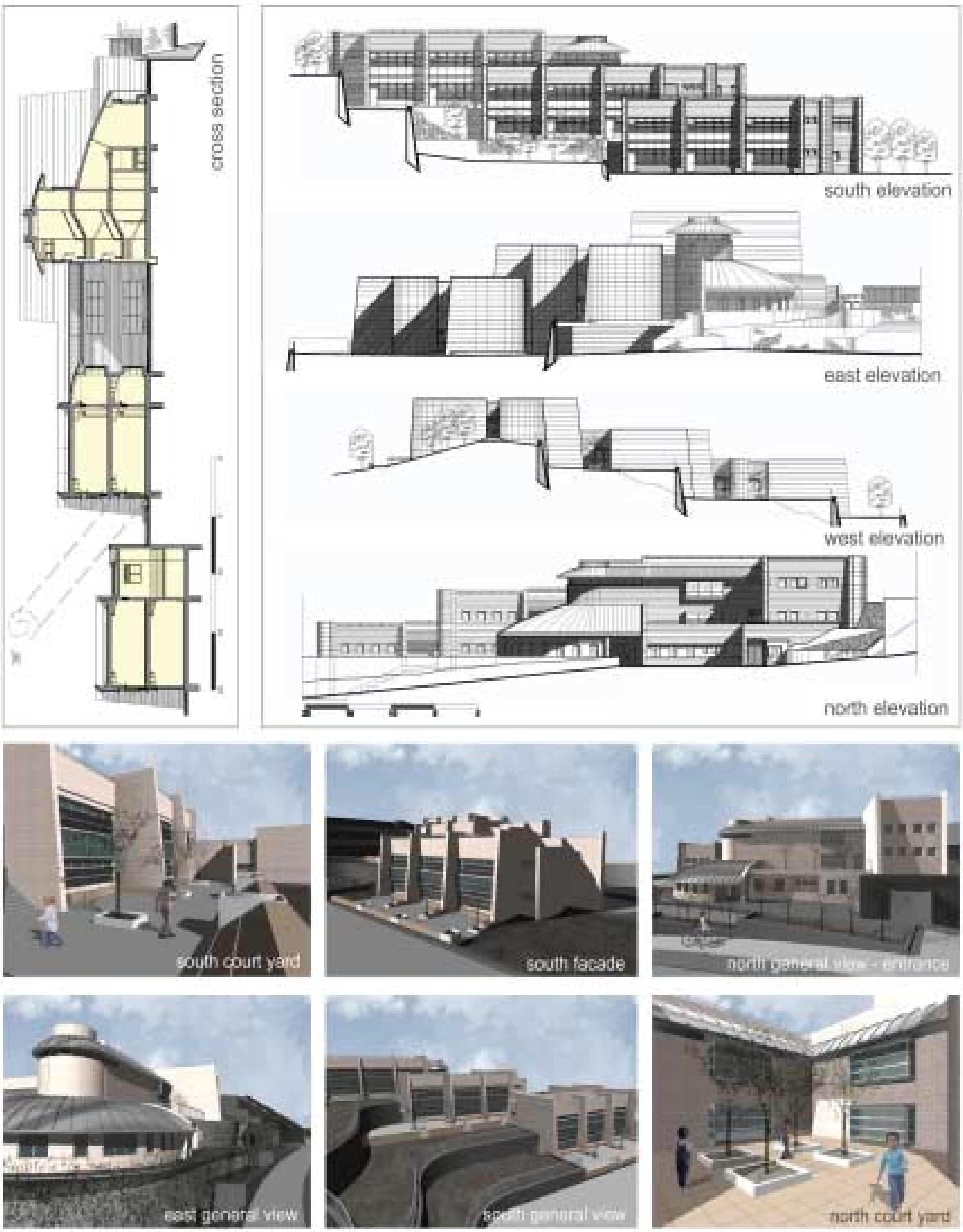
21.12 12:00



21.06 12:00

natural lighting simulation in class room ("radiance" prog.)

ANNEX I-4


cross section
south elevation
east elevation
west elevation
north elevation
south court yard
south facade
north general view - entrance
east general view
south general view
north court yard

ANNEX II: AUTHOR’S DECLARATION

I, the undersigned, being the authorised signatory of the consortium: Jerusalem Municipality Department of Public Construction, IRDEW, R. Lahav-Rigg Architects and Town Planners LTD, and Advanced Energy Systems LTD (AES) hereby declare that we

- are eligible in compliance with section 2.2 of the competition documents to participate in the competition
- are not participating in any other application for the competition
- have examined and accept without reserve or restriction the entire contents of the competition documents.
- approve the publication of the energy concept of our initiative under quotation of the author's name in the framework of the MED-ENEC project.
- in the case of being selected as pilot project we will conclude a contract with the awarding authority for the realisation of the pilot project to demonstrate the technical feasibility and profitability of energy efficiency measures in the construction sector, including the establishment of a monitoring scheme for measuring the energy savings in comparison to standard building, the development and implementation of a dissemination strategy and the documentation of the results as well as the lessons learnt of the pilot project.

We confirm that the costs of preparing our application for participation in the pilot project initiative are at our own charge and will not be reimbursed.
We furthermore understand that there is no right of appeal with regard to the evaluation process and the decision of the evaluation committee.

Yours faithfully

Aharon Ben-Noon
Director
Consortium Leader

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Israel, 27 July 2006